


Status of the
Literature Retrieval Division

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BACKGROUND INFORMATION

- A. Increase of "In Scope" Documents. Although the Scope of Coverage has not changed substantially in ten years, the number of articles found to be "in scope" has increased each year. Prior to 1975 the number of documents selected under the Scope was in the order of approximately 2,000 per year. The number increased substantially in 1975, and again in 1976, and then levelled off during the next two years.

However, in my letter of June 12, 1979, I made reference to the fact that we were experiencing "a dramatic increase in the number of routine articles being selected" and stated that this increase was in the order of 30% to 40%. Based on our current 1979 projection, it appears that the increase will be closer to 50%. Note that this does not include the asbestos literature.

	<u>Documents Selected</u>
1975	3,597
1976	5,219
1977	4,973
1978	5,600
1979	8,300 (Projected)

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The reasons for the observed increases are not clear, but it is unlikely that the increases are spurious. We have studied the data generated during our normal course of operations, and these data do not provide an explanation. A study to determine the nature and type of articles selected during past years would be virtually impossible, since there is no easy way to reconstruct the past. An ongoing study to analyze the literature on a prospective basis is currently being designed.

Assuming that the present trends continue, and estimating a 20% increase per year in the number of routine documents being selected, our projections for the future are alarming:

	<u>Documents Selected</u>
1980	10,200
1981	12,240
1982	14,700

To date, we have dealt successfully with the increasing number of documents being selected by expanding our staff, increasing our productivity and carefully establishing priorities for document processing. This approach will not be adequate for our future needs, since a major rate-limiting step is the ability to hire and train abstractor/indexers and editors to fully process documents.

- B. Document "Backlog". The total number of documents in the "backlog" has been increasing substantially, reflecting the increasing number of "in scope" documents. The "backlog" is the difference between the number of documents selected and the number that are fully processed, plus those that are already on hand. Based on our current projections, the number of documents in the "backlog" will soon be staggering, whether or not the asbestos documents are considered.

	<u>Documents Selected</u>	<u>Documents Fully Processed</u>	<u>"Backlog"</u>
1975	3,597	3,250	2,724
1976	5,219	4,093	4,379
1977	4,973	4,139	4,919
1978	5,600	5,013	5,463
1979*	8,300	5,100	9,100
1980*	10,200	6,000	13,300
1981*	12,240	7,500	18,040
1982*	14,700	9,000	23,740

* These projections do not include the approximately 4,000 additional asbestos documents.

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As will be described in Section D, the Division has dealt with the retrievability of documents in the "backlog" by using the Preliminary Data Base.

- C. Overall Flow and Number of Documents. The total number of documents that flows through the Division's processing stations has been increasing substantially, also reflecting the increase in the number of "in scope" documents. The number of documents flowing ("in stream") is equal to the sum of the number of documents accessioned plus the number of documents that are fully processed. (The number of documents accessioned is the sum of the documents that are selected plus other documents for which there is a need to maintain scanning and other records.) Based on our current projections, the total number of documents "in stream" will soon be staggering, whether or not the asbestos articles are considered.

	<u>Documents</u> <u>Accessioned</u>	<u>Documents Fully</u> <u>Processed</u>	<u>Documents</u> <u>"In Stream"</u>
1975	6,454	3,250	9,704
1976	8,658	4,093	12,751
1977	7,739	4,139	11,878
1978	8,689	5,013	13,702
1979*	11,200	5,100	16,300
1980*	13,700	6,000	19,700
1981*	16,440	7,500	23,940
1982*	19,700	9,000	28,700

* These projections do not include the approximately 4,000 additional asbestos documents.

As will be described in Section D, the Division has dealt with the increasing number of "in stream" documents by improving and expanding our manual procedures.

D. Implementation of the Preliminary (In-Process) Data Base and Streamlining of the Operation. As early as 1975, we at the Division were alarmed by the upward trends that were then apparent in the "backlog" and in the number of documents "in stream." At that time, and thereafter, we stressed the need to establish guidelines for assigning different levels of processing to certain documents, since full processing requires experienced abstractor/indexers and editors who are difficult to hire and who require more than a year to train. This recommendation was focused upon in connection with the evaluation of the Scope of Coverage for articles that deal with the cardiovascular system. A memorandum dated January 27, 1976 summarized this matter. In addition, we also recommended in 1975 and thereafter, the development and implementation of more sophisticated mechanical systems to help deal with the increasing number of documents both in the "backlog" and "in stream."

At that time the industry did not wish to proceed with these two recommendations. Because the Division was faced with the practical problem of dealing with these situations, we implemented a new and separate data base that is updated frequently (weekly) to provide a mechanism for controlling the documents awaiting processing. We then developed this Preliminary (In-Process) Data Base to a level where documents could be retrieved by most of their bibliographic data and by broad topical classifications. Thereafter, additional steps were taken to improve the retrievability of the documents in the Preliminary Data Base.

Since the Preliminary Data Base was designed using many of the same programs and procedures that are used for the Standard Data Base of fully processed articles, development and implementation costs were kept to a minimum. In addition, because of the similar formats and structuring of information, there is complete compatability, including the ability to merge the two data bases readily. However, since the documents in the Preliminary Data Base do not have descriptors, topical searches must be performed using broad classifications, and then manual procedures are used to narrow the search results.

By late 1977, it became clear to us at the Division that our existing mechanical and manual systems and procedures would soon be inadequate to deal with the "backlog," the increased traffic of documents flowing through the various processing stations or the use of the Preliminary Data Base to retrieve articles by topic. As a result, we streamlined and improved our procedures to the maximum extent we believe is possible. Thereafter, we initiated studies to determine the feasibility of implementing new mechanical systems (including on-line computer systems), keeping in close contact with the Division's systems consultants.

It is important to note that during all these years we have always provided complete and up-to-date responses for the industry in spite of major operating constraints that have required us to maintain two separate data bases and to expand all our manual procedures.

- E. User Requests and Current Awareness Updates. The number of user requests and current awareness updates has increased each year, reflecting the industry's growing use of, and reliance upon, the Division's resources and capabilities. In addition, the increasing complexity, and the nature, of user requests has required greater levels of participation and sophistication by the Division's staff.

	<u>Number of User Requests</u>	<u>Number of Current Awareness Updates</u>
1973	129	50
1974	286	83
1975	395	99
1976	492	112
1977	681	143
1978	830	193
1979*	960	200

* Projected

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Growing numbers of documents in the "backlog" and "in stream" obviously have not prevented us from providing complete and up-to-date responses for the industry. Indeed, high levels of user satisfaction, as measured by the continuing and dramatic increase in their utilization of the Division, are a reflection of the overall high quality of our products and services.

Based upon the Division's record of performance to date, including our proven ability to respond effectively to rapidly changing priorities, there is no doubt that we would have been able to deal with a law suit or other similar emergency during 1979 in spite of the "backlog," the increasing number of "in stream" documents, and the great onus placed upon us by our activities in connection with the asbestos literature. Nevertheless, there is obviously a limit to our ability to respond in the future under the current operating constraints, since this will require an ever expanding staff, with associated personnel and management complexities, and additional costs. These matters are amplified in Sections F and G.

- F. Personnel. The Division's staff has expanded each year to help deal with both the increasing number and complexity of user requests and the increasing number of documents in the "backlog" and "in stream." Besides adding more abstractor/indexers and editors, who are the key people needed to fully process documents, other employees have been added to handle the various support functions necessitated by a) the very complex and cumbersome manual and semi-automated systems that have evolved, b) the control and maintenance of two separate data bases, and c) the overall management of a continually expanding staff and physical plant.

Thus, instead of altering our systems approach for processing, storing and retrieving documents, we have continued to employ and train more and more people. This was an acceptable and cost-effective course of action when the number of documents in the "backlog" and "in stream" was manageable, and in the absence of crash programs to rapidly process large numbers of documents not

traditionally selected under the Scope of Coverage. However, today, the number of trained people needed to fully process all documents cannot keep pace with the growing number of documents.

Since the operation of the Division is largely dependent on personnel that require extensive in-house training, we are not able to adjust quickly to large and sudden increases in the number of documents to be fully processed. As our staff is expanded, the time and attention of our managerial staff must be diverted to the hiring and training of new employees. This training process is quite time-consuming. Abstractor/indexers, when hired, generally have no in-depth knowledge regarding either tobacco and health or our unique abstracting and indexing techniques. We train these individuals as specialists in one or a few topical fields defined by the Scope of Coverage, and about one year is required to complete the training. Editors must first be trained as abstractor/indexers and then spend another one to two years doing this work before they can be given an opportunity to qualify. Of course, training efforts are not always successful, and some of these individuals either resign or have to be terminated. Thus the amount of time needed to hire and train new individuals, coupled with normal employee turnover, makes rapid expansion of our staff quite difficult. And naturally, as the staff grows in size, there are more instances of employee turnover.

	Number of Employees 12/31
1976	40
1977	45
1978	50
1979*	65
1980*	90

* Projected

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Earlier this year we began to believe that we might be experiencing unique problems regarding employee turnover, and a study and evaluation of this matter was undertaken in June. The study revealed that, with few exceptions, the lengths of service of professional and semi-professional employees fell within the guidelines established for each job function. (These guidelines are based on the job market and on the Division's expectations relative to the training time and cost.) The study also revealed that employees left the Division for a wide variety of reasons, including growth potential, higher salary, change of profession, return to school, spouse influence and various personal reasons. Besides all these factors, there certainly was some impact on turnover as a result of the disruption due to our move to new quarters and the Division's rapid pace and rapidly changing priorities in response to user needs, such as the need to deal with the asbestos literature.

The overall findings of the study indicated that our level of employee turnover was not extraordinary for the information industry in the New York City area. However, we were feeling a great impact mainly because of our heavy dependence on personnel that require extensive in-house training, especially abstractor/indexers and editors.

As a result of the study, and in anticipation of future growth in staff, we took a number of actions, including expanded use of personnel consultants in the area of hiring, reevaluation of job descriptions and job specifications, and reevaluation of salaries and salary ranges in light of recent changes in the New York City job market. A number of recommended changes already have been implemented.

Unfortunately, during the latter part of 1979, we also were faced with a variety of unrelated personnel problems, including chronic illness, jury duty, leaves of absence and disappointing results in our efforts to fill certain key positions.

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In spite of these extraordinary situations, the Division continued to provide complete and up-to-date responses for the industry during the entire year. This was accomplished by skillfully managing our priorities, by the use of temporary help, overtime and subcontractors, and by the sustained efforts and sheer stamina of a number of interested, dedicated, career-oriented professionals here at the Division. The industry owes these people a special thank-you and a vote of confidence.

In summary, it must be clearly understood that the process of employing and training more and more people, continually "fueling" a largely personnel-dependent operation (while depending heavily on the stamina of a core of dedicated career employees to bear the burden until new employees are hired and trained) will certainly not be adequate for our future needs.

- G. Cost-Effectiveness. Even though the Division's activities and responsibilities have increased substantially over the years, we have shown an extraordinary record of cost-effectiveness. Using a rough measure of cost-effectiveness based on the unit cost to fully process documents, the annual costs have remained remarkably low and stable:

	<u>Average Unit Cost to Fully Process Documents</u>	<u>Index of Cost Effectiveness</u>
1971	\$1,260	-
1972	338	1.24
1973	363	1.33
1974 (Base Year)	273	1.00
1975	313	1.15
1976	254	0.93
1977	278	1.02
1978	272*	1.00
1979	319**	1.17
1980***	360+	1.33+

* Excludes costs related to move to new quarters.

** Excludes increased costs for office space in new quarters.

*** Projected.

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to collect those unique references that were not already in the System (approximately 4,000 articles.)

Of the 5,200 unique references, approximately 1,200 were already in the System. In addition, the System was found to contain approximately 1,300 documents that deal with asbestos that were not cited in any of the bibliographies we received. Therefore, the Division currently houses a collection of approximately 2,500 documents that deal mainly with asbestos or asbestos-related diseases and conditions, already fully processed, together with about 3,250 of the new articles that have been collected to date. (Approximately half of the 750 outstanding items cannot be obtained because they are unpublished papers, out-of-print textbooks, personal communications, motion pictures, slide presentations, etc.)

It is important to note that, as an individual library, the Division's holdings are certainly more extensive than any of the bibliographies we received, and we believe that our collection is close to being complete on the subject of the alleged involvement of smoking in asbestos-related diseases. In fact, the Division's collection of fully processed asbestos-related articles is more extensive than the bibliography that we understand was filed by Johns-Mansville in answer to interrogatories in one of its cases.

During the summer and fall, we met with industry lawyers on a number of occasions to help draft a Scope of Coverage for the asbestos literature, which was finally completed and distributed on November 14th. In preparing for these meetings, we made extensive studies of the asbestos literature and provided comprehensive written and oral reports summarizing our findings, as well as a number of texts and documents for orientation purposes. We estimated that there were probably about 1,000 to 2,000 other published articles on asbestos that we did not have and that these would be difficult to identify. We also estimated that there probably were 6,000 other documents that were not identified that might be important to a complete survey of the asbestos literature, because they concerned the causation of asbestos-related diseases or conditions by factors other than either asbestos or smoking.

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The lawyers decided that we should not attempt, at this time, to identify or obtain the estimated 6,000 documents that deal with "other factors," but so far no instruction has been received by the Division regarding the estimated 1,000 to 2,000 other asbestos-related articles that may exist. (We could identify and obtain these articles in a relatively short time by using a subcontractor.)

Recently, we were informed that the need to process the asbestos literature may not be as urgent as it was before, but we understand that there is still a high priority on the project. When we were requested to determine the cost to fully process all the asbestos documents, we found this to be a difficult exercise in the absence of clear-cut priorities for full processing, since the number of articles in question would amount to 80% of our total output of fully processed articles for this entire year and two-thirds of our projected output for 1980.

Further, I had noted in my April 6, 1979 memorandum titled "The Asbestos Literature" that the intermediate and long-range plans for the Division (physical plant, equipment, staff, systems, procedures, etc.) did not take into account additional articles from sources other than the tobacco-related literature, and this was before we knew the extent of the growth in this literature.

Obviously, the problem caused by the asbestos literature is serious, especially when considered in light of the increasing numbers of documents in the "backlog" and "in stream." The future projections for the "backlog" are astounding:

	<u>Documents Selected</u>	<u>Documents Fully Processed</u>	<u>"Backlog"</u>	<u>Asbestos Documents</u>	<u>Total "Backlog"</u>
1978	5,600	5,013	5,463	-	5,463
1979	8,300	5,100	9,100	+ 4,000	= 13,100
1980	10,200	6,000	13,300	+ 4,000	= 17,300
1981	12,240	7,500	18,040	+ 4,000	= 22,040
1982	14,700	9,000	23,740	+ 4,000	= 27,740

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We were able to collect most of the asbestos documents, record limited bibliographic data and create an Asbestos Data Base in a relatively short period of time (approximately six months), only because the types of personnel required for these tasks (i.e., librarians, bibliographers and keypunchers) are readily available in the job market and do not require an excessively long training period. But the overall activity in connection with this project had a major impact on our operations and significantly diverted our attention. Had we had a more sophisticated mechanical system, the task of building an Asbestos Data Base would have been much easier, requiring far less effort and expense, and would have had only a nominal impact on our operations.

Regarding subsequent processing of the asbestos documents, as I already noted in my April 6, 1979 memorandum, we will be unable to fully process them without interfering with the processing of other articles, since the total number of articles to be fully processed (i.e., the "backlog") exceeds our current and projected capacities. This is because full processing requires experienced abstractor/indexers and editors who are difficult to hire and who require more than one year to train. Furthermore, since these employees are hired and trained as specialists in one or a few topical fields, our capacity to fully process articles is somewhat dependent on the topics of articles in the "backlog."

Finally, and perhaps most disturbing, this sudden interest in a large body of literature that falls outside of our traditional selection guidelines may not be an isolated incident. We believe that a similar situation might occur again, since there appears to be increasing concern regarding an alleged involvement of smoking in the causation of other occupational diseases and conditions.

- I. Summary and Overview. Since 1972 the Division has demonstrated a spectacular growth and performance record. We have increased our productivity dramatically, successfully dealt with the increasing number and complexity of user projects and continued

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to provide high quality cost-effective products and services in spite of rapidly changing priorities, major operating constraints and sudden and unexpected increases in the number of documents being selected and processed.

As early as 1975, we at the Division recognized the need to develop and implement more sophisticated mechanical systems and to assign lower levels of processing for certain types of documents. Our recommendations were not accepted at that time, or thereafter. Unfortunately, even if our recommendations were to be accepted at this very moment, it is already too late to implement them in time to deal with the current situation.

Feasibility studies in connection with improving our mechanical systems were initiated during 1978, but these studies are not yet completed. In addition, system design, development and implementation, including the necessary parallel processing, will require at least 18 months under absolutely ideal conditions. During these months, the number of documents in the "backlog" and "in stream" will continue to increase. Unless immediate action is taken, our existing mechanical and manual systems will begin to fail - there will be additional delays entering documents into the Preliminary Data Base, the Preliminary Data Base will cease to be a useful tool for comprehensive retrieval of articles by topic, the Standard Data Base will no longer be as current, users may not be provided with complete and up-to-date responses, and we will not be able to effectively deal with another major emergency without a restatement of our priorities.

We must change our circumstances in order to ensure our future success. Certain steps must be taken promptly, so as to minimize our failures during the transition period, and simultaneously we must provide for our future needs. The advent of the asbestos project merely focused attention on a broader problem. We must act now. Past delays already have made the task far more difficult than it should have been, placing great additional burdens on all of us.

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RECOMMENDATIONS

These recommendations, both short-term and longer-term, deal with the present situation and, simultaneously, provide for the future. In the short term (i.e., for at least the next year), we have no alternative but to continue to use our already overloaded systems and procedures and to expand them where possible. This will require hiring and training additional employees, which will, at least temporarily, increase personnel and management complexities, stretch physical plant to near maximum capacity, and decrease cost-effectiveness. For the longer term, we must upgrade our mechanical systems and implement a procedure for assigning lower levels of processing for certain documents.

A. Short Term Recommendations: Utilization of Current Systems and Procedures. The following actions must be initiated immediately in order to minimize any system failures during the interim:

1. Continue to follow our traditional approach of hiring and training additional abstractor/indexers and editors to increase our capacity to fully process documents.
2. Improve the retrievability of documents in the Preliminary Data Base and expand its use:
 - a. Revise and expand the topical classification system for all documents currently in the Preliminary Data Base and for those that will be added prospectively.
 - b. Develop and implement a title word search capability for documents in the Preliminary Data Base.
 - c. Accelerate the processing of articles into the Preliminary Data Base by eliminating all document backlogs at the library/bibliography/accessioning stations.
 - d. Complete the gathering and preliminary processing of the 4,000 retrospective asbestos articles, which are currently listed in the Preliminary Data Base, but which have not yet been processed through the selection, classification or bibliography/accessioning stations.

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3. Initiate a study to determine why there has been a dramatic increase in the number of articles being selected for processing, with a view to possibly altering our selection guidelines or Scope Notes.
4. Initiate a study to determine whether we are currently "overabstracting" or "overindexing" fully processed documents. (Both the length of the abstracts and the number of index terms were increased substantially, relatively recently, following guidelines instituted by an industry consultant. There are now approximately 70 descriptors per document as compared to the 40 per document average for the entire Standard Data Base. We believe that certain of the descriptors being assigned are redundant. Abstracts are now approximately a third longer than previously. Abstracts traditionally are intended merely to serve as exclusionary tools to determine whether or not to read the original article. Our current abstracts go well beyond this purpose.)
5. Continue to expand and develop our management staff to handle the needs of a growing organization.

B. LONGER-TERM RECOMMENDATIONS

1. On-Line Systems. For the longer term, we must simultaneously and expeditiously complete our feasibility studies and implement the use of a more sophisticated mechanical system (on-line) for processing, storing and retrieving documents. An on-line system provides the ability to instantaneously update and retrieve information stored in a data base. This is accomplished using a keyboard/visual display unit (a "terminal") that is connected directly to a computer and said to be "on line" with the computer. A common example of an on-line system is the one used in modern airports to update and retrieve information regarding airline reservations. The operator retrieves and displays a "document," in this example a

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scheduled airplane with a certain number of first and second class seats. The operator can instantly update the "document" by adding ("enriching") or deleting "terms," in this case the names and seat locations ("classes") of passengers. The updated information becomes part of the data base and can be retrieved immediately by this operator and by any other operator with a terminal that is on-line to the same computer. Note that the airline data base system can retrieve "documents" only by "accession number" (i.e., by airline flight number/destination) and cannot search by "term." This type of system would be inadequate for a bibliographic data base such as ours, since the ability to perform searches of weighted terms is essential.

We anticipate that the Division's on-line system ultimately will combine a number of data capture, data entry, data preparation, text processing and search functions. Initially, it can be used for documents in the Preliminary Data Base, but we should preserve the future options of extending the application to the Standard Data Base and of permanently merging both data bases. The system design and the implementation schedule are crucial, since we must proceed in pre-planned stages in a manner that ensures continuity and does not pre-empt our overall objective. Thus, it is neither necessary nor desirable to modify our entire System all at once.

The use of an on-line system will provide a mechanism to readily deal with the documents in the "backlog" and "in stream," as well as large numbers of new documents that fall outside of our traditional selection guidelines, such as the asbestos documents. In addition, we will reduce our heavy reliance on cumbersome manual procedures, decrease our dependency on personnel that require extensive in-house training, curb the growth of new employees and

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the expansion of physical plant, place a reasonable ceiling on future costs and assure that we continue to provide complete and up-to-date responses for the industry.

2. Lower Levels of Processing for Certain Documents. The use of an on-line system also will provide a mechanism to readily implement a necessary change in our basic approach and philosophy regarding the processing of documents. It is no longer possible to fully process all documents or to maintain a retrievable "backlog" of documents awaiting full processing. Instead, our goal must be to process documents in as short a time as possible, and only to the extent needed to assure retrievability. Thus, in addition to routinely assigning priorities for document processing, we also must assign lower levels of processing to certain documents. These documents will be processed with only nominal effort and cost, but higher priority documents will continue to be fully processed as usual. Of course, priorities can be changed at any time, and lower level processed documents can be "enriched" and their processing accelerated as required to assure retrievability. Priority changes would have to be monitored closely and continuously in a joint effort by the lawyers and the Division.

In the past, the lawyers did not elect to proceed with this recommended approach because of two major objections. First, lower level processed documents will require more time to analyze, since there will be only an author abstract or an abbreviated abstract. Second, it will be impossible to anticipate the industry's future needs well enough to properly designate certain documents for lower levels of processing. These objections were raised when the "backlog" was manageable and prior to the need to be able to deal quickly with large numbers of documents that

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fall outside of our traditional selection guidelines. However, the circumstances have changed. Given the choice of not retrieving documents at all vs. increased time for analysis, the decision is clear-cut. Further, we believe that the question of how to properly designate documents for lower levels of processing is largely theoretical. There are thousands of articles in the "backlog," including many asbestos articles, that obviously do not merit full processing.

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FEASIBILITY STUDIES OF ON-LINE SYSTEMS

Our studies to date have established that the use of an on-line system is entirely feasible and that it will provide substantial benefits.

Studies were begun during 1978, keeping in close contact with our systems consultant. This work was initiated because we believed that the need for an on-line system ultimately would be recognized by the lawyers, and we did not wish to delay any longer. By June 1978, the use of a dedicated in-house minicomputer had come to be viewed as a definite possibility. A recommendation was made to conduct ongoing feasibility studies on a small scale and using only in-house personnel. The results of these initial studies were summarized in our reports "A Proposal for the Modification of Current Data Entry Methods" (August 1978) and "L.R.D. In-House Computer Study: Preliminary Findings" (November 1978).

Our overall conclusion at that time was that our attention should be directed, initially, only to improving our data input and data preparation functions. This limited objective appeared to be appropriate for the following reasons. First, of the Division's three major data processing functions of input, "throughput" (maintenance and information manipulation), and output, input was the weakest. Second, this limited objective could be accomplished relatively quickly and would provide operational and cost benefits. Third, the new system would graphically demonstrate the use and advantages of on-line functions to the lawyers. Our 1979 budget included costs for the installation of sophisticated equipment to replace keypunch machines and typewriters. Even though the equipment costs would be higher, the overall cost for data input and data preparation was expected to decrease because of the various economies that were anticipated in other areas.

Studies of hardware vendors had led to the tentative selection of Inforex equipment to handle the task, and preparations for the changeover were initiated. However, shortly thereafter, we hesitated. The text processor and minicomputer markets and technologies

had been changing rapidly, and the industry had been undergoing a substantial "shakedown." Many vendors had been unable to deliver their advertised hardware or software systems, or to provide adequate maintenance and support, and other vendors were failing financially. In addition, I.B.M., which had been late entering this marketplace, announced that it would be offering a new product line for delivery within a year or two. Further, there was some question by now as to the stability of the Inforex corporation. Given all these circumstances, we were faced with a difficult decision. We had been very anxious to improve our data input and data preparation functions, the effort already had gained some momentum, and the anticipation of the new system had stimulated and excited our staff in a very positive manner. However, there was no sensible alternative except to discontinue this pursuit and reevaluate our position. (This action proved to be quite prudent, since Inforex filed for bankruptcy a few months later.) Ultimately, we identified a more financially stable hardware vendor with a good record of maintenance and support, Four-Phase Systems, Inc. On the possibility that I.B.M.'s newly announced product line might eventually prove to be useful, we also submitted a nonbinding letter of intent to lease one of their systems, with delivery scheduled for December 1980.

As stated above, our initial objective had been limited. Our experience had shown us, however, that our efforts to accomplish this limited objective might better be applied as the first step toward the staged implementation of a totally integrated on-line information system, possibly using an in-house minicomputer. This possibility would depend, in part, on the time that would be required to design and implement a totally integrated system, the availability of reliable, economical hardware and operating systems, and the resolution of a question regarding the possible need to provide a backup system for at least the data input and data preparation functions for use during system breakdowns. Our systems consultant agreed with this overall approach.

Because of the asbestos project and the unexpected increase in the number of routine documents that were being selected, we perceived a sense of urgency and a need to expedite our feasibility studies.

Subsequently, we engaged the services of outside software consultants to help assess the possibility of expanding our objectives toward implementing a totally integrated on-line information system.

System requirement specifications and manuals largely were completed by November 1979, but this accomplishment was quite difficult. More than three hundred hours of managerial staff time was consumed by this project during a period when this group's attention already was significantly diverted by the asbestos project, the hiring and training of new employees, the processing of record numbers of documents and user requests, and the large number of extraordinary problems that were encountered during 1979.

However, the system requirement specifications appeared to be well worth the effort. The System that was finally conceptualized was, indeed, totally integrated. Not only could it handle the data input and data preparation functions, it also could handle virtually every other function, including data edit, term control, term maintenance, term cross reference, acronym glossaries, text processing, controlled and uncontrolled vocabularies, document storage and retrieval, weighted term retrieval, retrieval by index terms and by title words, and storage and display of abstracts. The new system could be extended to eliminate almost all our manual procedures and provide a basis for a "paper free" office environment. Further, by physically distributing the input terminals for use by the individuals responsible for capturing the data, instead of using a pool of keyboard operators, a number of redundant keyings and clerical and coding functions could be eliminated. The total concept seemed so obvious that it was difficult to believe that it was novel. But, to date, we have been unable to identify any information system that adequately combines all these functions, and we believe that we are "trail blazing" as we did before, more than 15 years ago, when the current system was conceived and created. However, a number of questions still have to be resolved.

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It is now important to complete our feasibility studies promptly and without interruption. A full-time in-house effort is needed, one that will not be readily diverted by changing Divisional priorities, and a senior systems manager is scheduled to join our staff early in 1980 to lead this activity.

ROLE OF THE LAWYERS

During the past, the lawyers have not always been able to devote much time or attention in direct dealings with the Division, and this has resulted in some rather frustrating and difficult situations for us. These situations obviously did not prevent us from operating successfully, but I would have preferred a closer and more continuous relationship with the lawyers.

We now have a very serious problem that requires your attention. I believe that the industry would be well served if the lawyers were to provide more consistent, regular interaction. This would help immensely at this crucial time, and, in the future, could provide a basis for establishing mutual responsibility and accountability.

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